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ABSTRACT

Phase II was a field evaluation of a communication and learning system package of films, simulation games, discussion questions, and posters designed to promote career awareness in junior high school children. It was proposed that this evaluation serves as a prototype for the assessment of the effects of learning systems on the affective and cognitive domains of the target audiences. In the experimental testing design, 1460 children in selected fifth, seventh, and ninth grade classes in three Texas cities of varying sizes underwent training with the use of the system. Experimental and control classes were tested before and after the former classes were exposed to the materials. Results indicated that the materials had a significant effect upon increases in knowledge about different careers, knowledge on where to get training for those careers, and upon increased positive attitudes about job importance and job favorability. These effects had generality across pupil grade levels, and teachers' attitudes about the materials. (Author)

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PROJECT CARE PHASE II:
A CASE STUDY IN THE EVALUATION OF
COMMUNICATION AND LEARNING MATERIALS

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Abstract

Project Care Phase II was a field evaluation of a communication and learning system package of films, simulation games, discussion questions, and posters designed to promote career awareness in junior high school children. It is proposed that this evaluation serve as a prototype for the assessment of effects of learning systems on the affective and cognitive domains of target audiences. In the experimental testing design, 1460 children in selected fifth, seventh, and ninth grade classes in three Texas cities of varying sizes underwent training with the use of the system. Experimental and control classes were tested before and after the former classes were exposed to the materials. Results indicated that the materials had a significant effect upon increases in knowledge about different careers, knowledge on where to get training for those careers, and upon increased positive attitudes about job importance and job favorability. These effects had generality across pupil grade levels, sex, ethnicity, parental occupational and educational levels, and teachers' attitudes about the materials. A component experiment indicated that results were essentially the same for ninth grades (the only tested) whether or not teachers had undergone training in the use of the materials. Subjective questions indicated a high degree of favorability of the pupils toward the materials.

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Abstract

Project Care Phase II was a field evaluation of a training package of films, simulation games, discussion questions, and posters designed to promote career awarenesses in ~~grade~~ junior high school children. In an experimental testing design, 1460 children in selected fifth, seventh, and ninth grade classes in Houston, Port Arthur, and Conroe underwent training with use of the package. Experimental and control classes were tested before and after the former classes underwent training. Results indicated that the materials had a significant effect upon increases in knowledge about different careers, knowledge on where to get training for those careers, and upon increased positive attitudes about job importance, and job favorability. There were no effects upon measures of seeing oneself in such jobs. The above effects had generality across pupil grade levels, sex, ethnicity, parental occupational and educational levels, and teachers' attitudes about the materials. A component experiment indicated that results were essentially the same for ninth grades (the only tested) whether or not teachers had undergone training in the use of the materials. Subjective questions indicated a high degree of favor of the pupils toward the materials.

Introduction

Objectives

Project Care, Phase I involved the development of The Occupational Awareness Multi-Media Package, which consisted of films, simulation games, discussion questions, and posters. The basic purpose of this project, Phase II, was to determine the effectiveness of the package by conducting a series of field experiments.

Evaluation data were gathered in fifth, seventh, and ninth grade classes in schools sampled in Houston, Port Arthur, and Conroe, Texas. Within each school, classes were divided between experimental groups, which underwent career awareness training with the package, as against control groups, who were tested but did not receive the training materials. Within each test area several additional ninth grade classes were tested where, although the class underwent career awareness training, their teachers did not receive in-service training in the use of the materials.

Evaluation materials included subtest measures of five key variables representing knowledge and attitudes associated with the aims of the training packages. These subtests were:

1. knowledge about different careers
2. knowledge of where to get training for these careers
3. favorability of attitude toward the importance of these careers
4. favorability of attitude about the careers themselves
5. favorability of attitude of seeing oneself in one of these careers

Secondary information was obtained on pupils' attitudes about the materials as well as teachers' evaluation which were obtained at the conclusion of in-service training.

Problem

The specific aims of the evaluation design were to answer the following questions:

Effects of materials: What are the effects of the materials upon occupational knowledge and attitudes for each of the fifth, seventh, and ninth grades, and how do such effects vary across test cities?

Pupil differences: How do effects of the materials vary according to such variables as pupil sex, ethnicity, parent education and occupation, and teachers' attitudes toward the materials?

Pupils' evaluations: What are pupils' evaluations of the package, the films, games, and posters, and what are their attitudes toward this type of instruction?

Effects of teacher training: What are the effects upon occupational knowledge and attitudes, and upon pupils' evaluation of materials due to having teachers trained in use of the materials?

Teachers' evaluations: What were teachers' evaluations of the materials and of in-service training?

Organization of the Report

To facilitate presentation of the overall results, this report is arranged in order from the general to the specific. The next section presents the major results of the research.

This is followed by a more detailed description of the research method. A technical appendix contains summaries of statistical details as well a sample copies of testing materials.

Overall Results

Effects of Materials: *What are the effects of the materials upon occupational knowledge and attitudes for each of the fifth, seventh, and ninth grades, and how do such effects vary across test cities?*

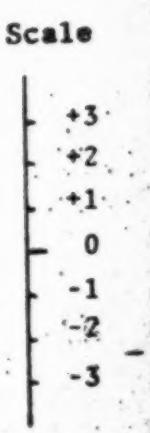
Subtest gains in all cities combined. In the analyses of combined data, consistent occupational knowledge gains and increased favorability of attitudes were found in the fifth, seventh, and ninth grades as a function of undergoing occupational awareness training. In the following subtests, the average gains from pre- to post-tests were significantly (see Technical Appendix for statistical details) greater for experimental groups (receiving training) than control groups (no training): Occupational knowledge, training knowledge, attitude of job importance, and attitude of job favorability. Only on the subtest of favorability of oneself in given jobs were there no appreciable gains nor differences between experimental and control groups.

Table 1 summarizes these results in graphic form. Results are arranged so as to emphasize comparisons between control and experimental groups for each subtest and for each grade. Asterisks indicate the comparisons where differences in gains between experimental and control groups were statistically significant.

The combined data also showed a slight tendency for some differences in subtest gains according to grades. Ninth grades tended to gain more in training knowledge than did fifth and

Table: 1 Score Gains : All Cities Combined.

Score	Fifth Grade		Seventh Grade		Ninth Grade	
	cont.	exp.	cont.	exp.	cont.	exp.
Occupational knowledge		*		*		*
Training knowledge		*		*		*
Attitude of job importance		*		*		*
Attitude of job favorability		*		*		*
Attitude of self in job						



*Statistically significant ($p<.05$) difference between control and experimental group gains.

seventh grades. Seventh and ninth grades increased more than fifth grades in terms of ratings of job favorability. These two findings can be interpreted as modest evidence that the materials, at least in terms of two measures in the overall analyses, were slightly less effective with the younger children. However, on two other measures--occupational knowledge and job importance--there were no differences.

In all, there was abundant evidence in the overall analyses that the materials had effects on four of the five main assessment measures.

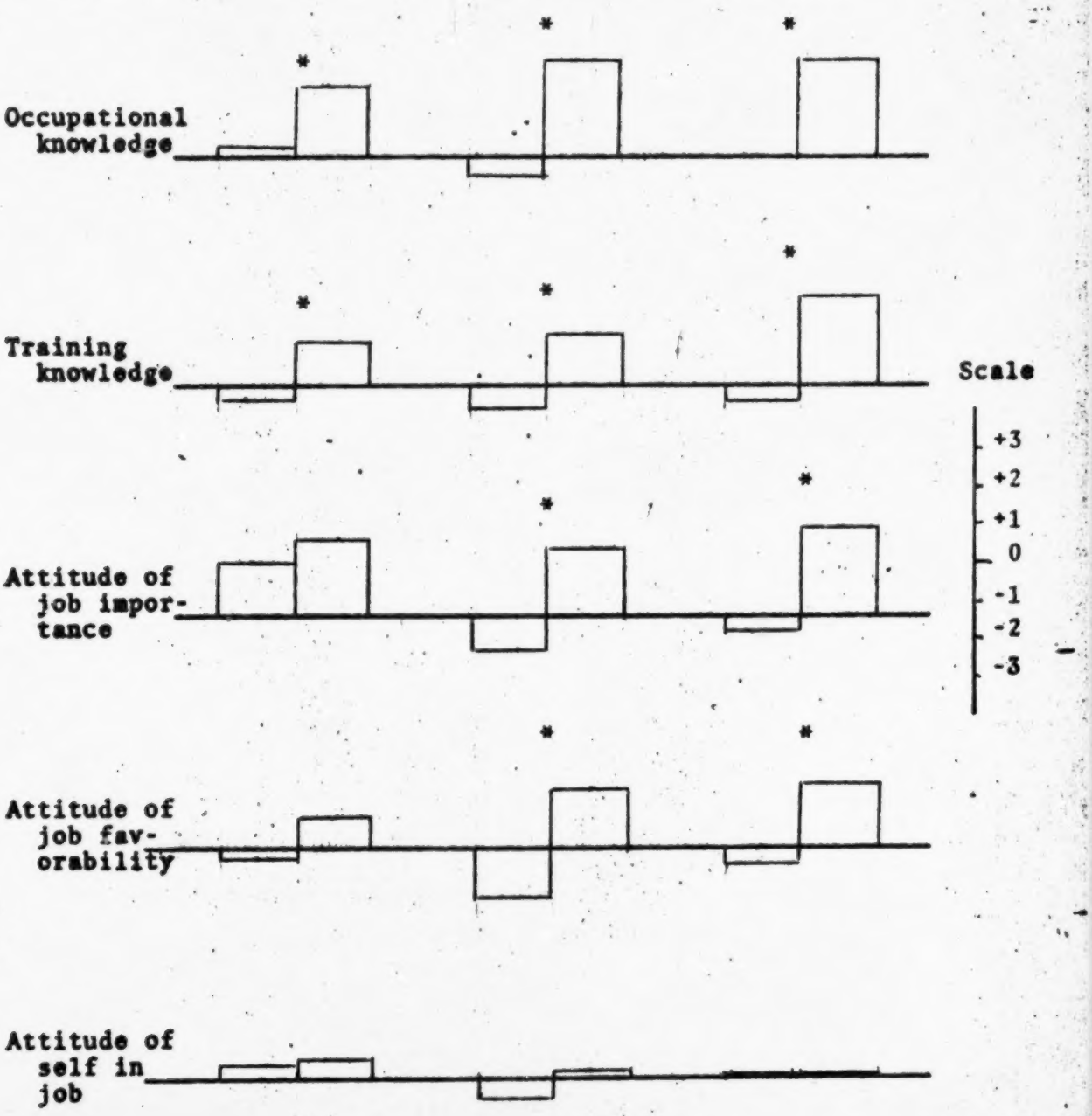
Subtest gains in Houston. The Houston analyses indicated that experimental groups gained significantly more than control groups in all three grades on the two measures of occupational knowledge and training knowledge. Further, gains in experimental groups exceeded control groups for the seventh and ninth grades on measures of attitude of job importance and attitude of job favorability. As in the overall analyses, there were no significant gains on the measure of attitude of self in job.

Table 2 is a graphic summary of the Houston results. In the most general terms it indicates that the materials were more effective in seventh and ninth grades as compared with fifth grades. Additionally, the materials appear to have no effects upon increasing favorability of pupils' attitudes about seeing themselves in selected careers.

Subtest gains in Port Arthur. Again, analyses indicated that the materials had a significant effect upon gains in occupational knowledge and training knowledge across all three

Table: 2 Score Gains: Houston

Score	Fifth Grade		Seventh Grade		Ninth Grade	
	cont.	exp.	cont.	exp.	cont.	exp.



*Statistically significant ($p<.05$) difference between control and experimental group gains.

grades and no effects upon attitude of oneself in various jobs. Results were mixed in terms of effects upon attitude of job importance and attitude of job favorability. Here significant gains in the experimental groups over control groups were found for fifth and seventh grades in terms of attitude of job importance, but not in ninth grade. Finally, only fifth grades showed an effect of the training materials in terms of attitude of job favorability.

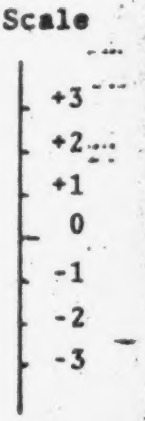
Again results are summarized in graphic form (Table 3). One feature unique to the Port Arthur results was that if any overall grade differences were to be found, they slightly favored the fifth and seventh grades over the ninth grades. Similar to the other analyses, knowledge gains were the most consistent effects of the training, and attitude of oneself in particular jobs was unchanged.

Subtest gains in Conroe. Results of the testing in Conroe indicated significant gains by the experimental groups over the control groups in the three measures: Occupational knowledge, training knowledge, and attitude of job importance. Increases in attitude of job favorability were found for seventh and ninth grades, but not for fifth grades. Again, no effects were found in terms of attitude toward oneself in various jobs.

Table 4 is a summary of the Conroe results. Here there was no overall tendency for some grades to do better than others; the picture was mixed. Knowledge gains, however, are clear cut, and attitude effects were as great or greater than in the other two cities.

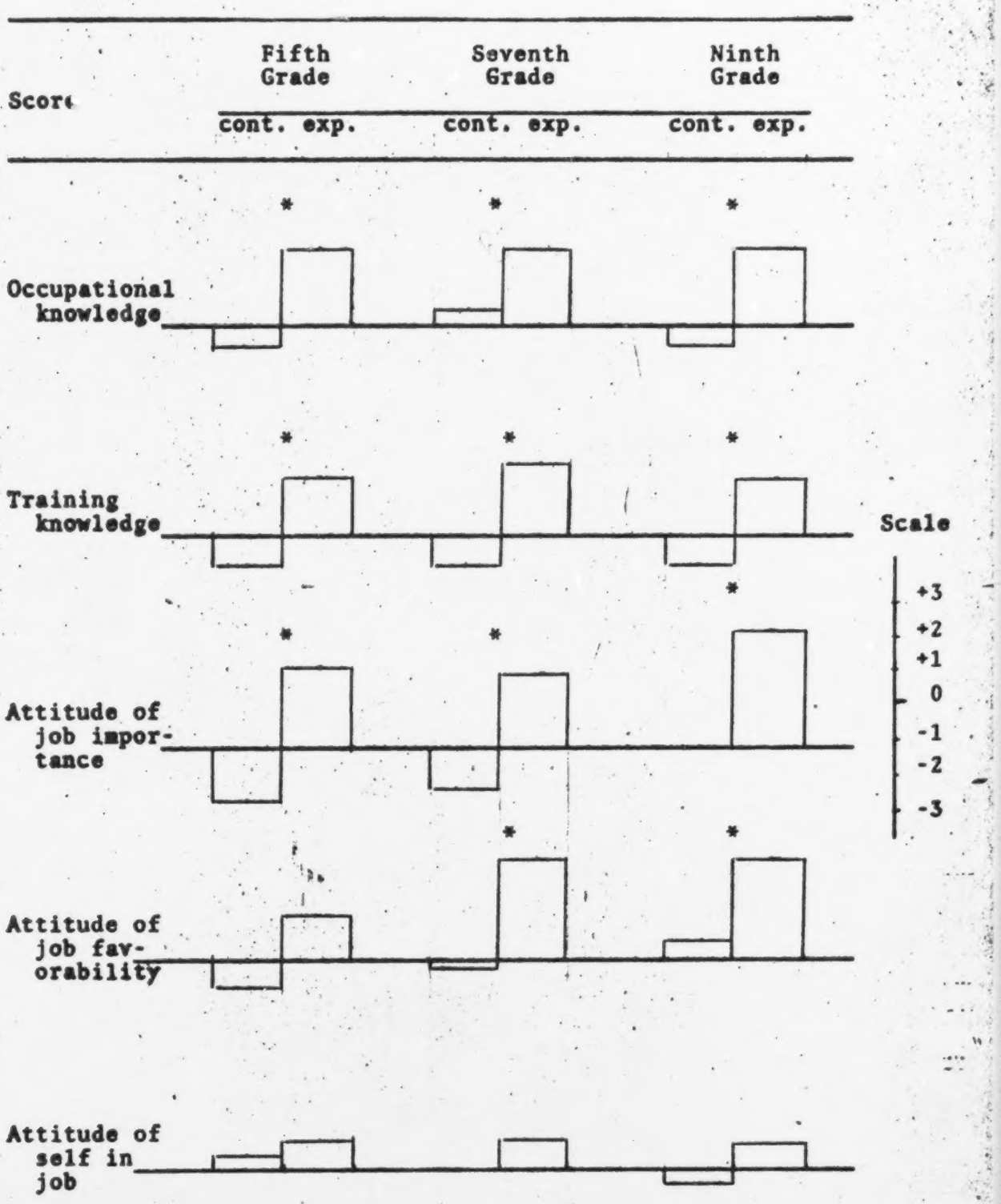
Table:3 Score Gains: Port Arthur

Score	Fifth Grade		Seventh Grade		Ninth Grade	
	cont.	exp.	cont.	exp.	cont.	exp.
Occupational knowledge		*		*		*
Training knowledge		*		*		*
Attitude of job importance		*		*		
Attitude of job favorability		*				
Attitude of self in job						



*Statistically significant ($p<.05$) difference between control and experimental group gains.

Table: 4 Score Gains: Conroe



*Statistically significant ($p<.05$) difference between control and experimental group gains.

Some generalizations:

1. The training package had the most consistent effects upon increases of knowledge about various occupations and increases in knowledge of where to get training for these occupations. These effects have generality across the three test cities.

2. Changes in attitudes toward the importance of jobs mentioned in the occupational awareness training package were generally consistent and favorable across all test cities and grades. Only the fifth grades in Houston and the ninth grades in Port Arthur failed to show changes.

3. Changes in attitudes toward the favorability of selected careers were found for the most part in all cities, but with more exceptions than attitudes about job importance. No pattern of these differences seemed evident.

4. The materials apparently had no effects upon changes of attitude about oneself in various occupations. There were very few pre-to post-test changes and no differences between experimental and control groups.

5. There was a slight tendency for seventh and ninth grades to show more consistent effects of occupational training. However, this was not a major difference, and it was somewhat reversed in the Port Arthur results.

Pupil Differences: *How do effects of the materials vary according to such variables as pupil sex, ethnicity, parent education and occupation, and teachers' attitudes toward the materials?*

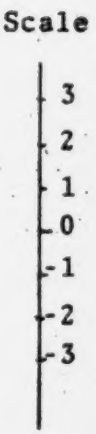
Gains relative to pupil sex. Both male and female pupils in experimental groups gained significantly more than their counterparts in the control groups in all subtests except attitudes of self in job (which had not been significant in any analyses). In gains in occupational knowledge and training knowledge, female pupils who received training did slightly better on the average than did male pupils. However, there were no differences between male and female students in the effects of the materials on attitude of job importance and job favorability.

Table 5 summarizes the sex difference by comparing experimental and control groups divided in terms of sex in the overall data from all cities combined. In this table it can be seen that the effects of the materials have considerable generality across pupil sex.

Gains relative to pupil ethnicity. With only one exception, all of the subtest gains found for the overall analyses of data from all cities were also found when analyses were done for control and experimental group comparisons within Black, Anglo, and Mexican-American ethnic groups. That is, on occupational knowledge, training knowledge, attitude of job importance, and attitude of job favorability, subgroups of Black, Anglo, and Mexican-American students who were trained with the package exceeded in gains over comparable groups who did not undertake

Table 5: Score Gains, Male as against Female

Score	Male		Female	
	cont.	exp.	cont.	exp.
Occupational knowledge		*		*
Training knowledge		*		*
Attitude of job importance		*		*
Attitude of job favorability		*		*
Attitude of self in job				



*Statistically significant ($p<.05$) difference between control and experimental group gains.

the training. The one exception was that Black pupils in the experimental groups showed no statistically significant gain differences over the control groups in measures of attitude of job favorability.

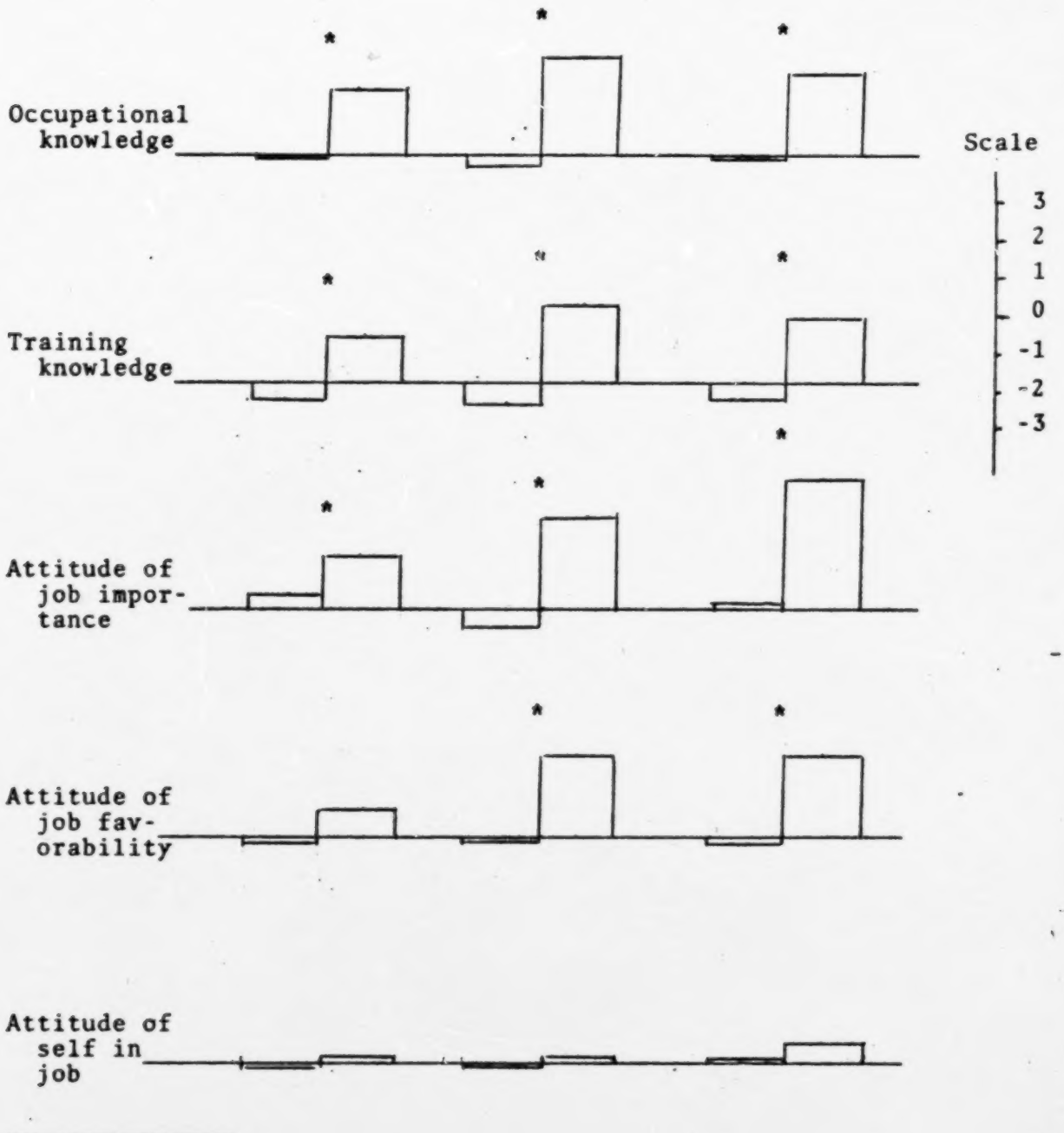
There was a slight but consistent and significant tendency for Anglo students in experimental groups to show greater gains than Black students. Mexican-American pupils, however did not fit consistently into such a pattern; they sometimes gained more, or sometimes less, than their counterparts.

Table 6 summarizes the gain scores in terms of ethnic groups. The general pattern of experimental groups exceeding control groups on the subtests can be seen in this table, as can the generality of findings across ethnic groups. Again, it can be noted that no groups gained on the measure of attitude of self in job.

Gains relative to parent occupation and education. Responses to the question of parent occupation were quantified in order to establish a numerical scale. To determine whether gains due to the training materials might be related to parent occupation, a correlation index was calculated between the numerical scaling of parent occupations and the gain scores for pupils. If this index were approximately .075 or greater, it would be statistically significant in this case; however, its magnitude would have to be upward of .40 or greater to be of practical concern here. The calculated correlations were: (.10) occupational knowledge; (.11) training knowledge; (.01) job importance; (.04) job favorability; and (-.06) self in job.

Table 6: Score Gains, Ethnic Differences

Score	Black		Anglo		Mex.Am.	
	cont.	exp.	cont.	exp.	cont.	exp.



*Statistically significant ($p<.05$) difference between control and experimental group gains.

The interpretations of these results were as follows: There is a statistically significant, but very slight, if negligible relation, between level of parent occupation and pupils' gains in occupational knowledge and training knowledge. This one might expect a very slight chance that, say, a son of a physician might gain more in knowledge scores from the training materials than the son of a laborer. There was no significant relation between parent occupational level and pupils' gains in ratings of job importance, job favorability, or self in job. In other words, gains in these attitudinal ratings appeared independent of the occupational levels of the pupils' parents.

Relations of gains with the parents' educational levels was examined in the same manner. Responses to questions on mother and father educational levels were averaged to provide one overall scale of parental educational level. Correlational indexes were calculated between this scale and the five main subtest gain scores. The same bases for interpreting the correlations as discussed above applied in this case.

Results indicated the following correlations with the parental educational level: (.02) occupational knowledge; (.01) training knowledge; (-.06) job importance; (-.04) job favorability; (-.06) self in job. Since none of these correlation indexes was statistically significant, it was concluded that gains in the five subtest measures appeared independent of the educational level of parents.

Gains relative to teacher attitudes. At the completion of training in use of the career awareness materials, teachers had been given a questionnaire which included items pertaining to their evaluation of the materials and their expectations of success. From these responses, a teacher attitude scale was developed. To explore the relation between pupils' gain scores and teacher attitudes, a correlation index was calculated and interpreted as discussed above.

Correlations in this case were: (.02) occupational knowledge; (.00) training knowledge; (.00) job importance; (.09) job favorability; (.074) self in job. Interpretations were: There was no apparent relation between teacher attitude toward the materials and gains in occupational knowledge, training knowledge, nor ratings of job importance. There were statistically significant, but very small, if not negligible, relations between teacher attitude and gains in ratings of job favorability and self in job. These meant that if a teacher were favorably disposed toward the materials, there might be a very slight effect that her pupils would gain more in ratings of job favorability and self in job. Again, however, this relation is small enough to be treated as probably negligible.

Some generalizations:

1. The effects of the training materials were similar for male and female pupils in measures of gains in occupational knowledge, training knowledge, job importance, and job favorability. However, females did slightly better in gains on the knowledge measures.

2. For the most part, gains in occupational knowledge, training knowledge, job importance, and job favorability had generality across Black, Anglo, and Mexican-American pupils. Anglo students, however, had a very slight tendency to gain more than Black students.

3. There were no important relations of parent occupational level or educational level with pupils' gains from use of the training package.

4. There were no important relations between teachers' attitudes toward the materials and the effects of the training package upon pupils.

Pupils' Evaluations: *What are pupils' evaluations of the package, the films, games, and posters, and what are their attitudes toward this type of instruction?*

Tabular summary. Table 7 summarizes in terms of proportional breakdowns the pupils' responses to questions about the training. These proportions are calculated for a breakdown of responses by grades, by sex, and by ethnicity. Each proportion represents the relative number of responses to each multiple response item for a question. Thus, for example, in Table 7 there is a proportional breakdown of the different responses of fifth graders to question number 130 on how good pupils thought the materials were for students their age. Here, .54 means that 54 percent of the fifth graders responding to the question felt that the materials were about right for their age.

Table 7 may be consulted directly for a detailed summary of results; however, the following will offer a briefer summary.

Age rating. In all cases the majority of pupils thought that the materials were "about right" for people of their ages. Ratings tended to become more favorable as children were from higher grades, and for females as compared with males. There were apparently no ethnic differences.

Rating the teacher. Most pupils rated their teachers as doing "an especially good job" in making the best use of the training materials. Fifth graders gave somewhat more positive ratings on this. There were no major sex differences. Mexican-Americans tended to rate their teachers somewhat higher than did the other two groups.

Use of media materials in other classes. Most students gave favorable responses to the question of whether they would "learn more" if subjects such as math, English and social studies used games, posters, and films. There were no major differences in responses to this question by grades nor sex. Black and Mexican-American students did tend to answer this question more favorably than did Anglo students.

Best film. Among the three grades, the film on health care received the highest ratings, however it was closely followed by the film on criminal justice. Female pupils rated health care higher than criminal justice, whereas males rated criminal justice the higher of the two. Mexican-American pupils rated criminal justice higher than health care, whereas Black and Anglo students rated health care the higher.

Best game. All grades, both sexes, and all three ethnic groups rated the criminal justice game as the best. This was followed by the game on aerospace.

Best poster. The criminal justice poster was generally rated as the best. However, this selection was not a majority one; it averaged approximately one-fourth of the responses.

Materials learned the most from. The majority of students listed the films as the materials that they learned the most from. This was generally the same across all grade, sex and ethnic categories.

Most interesting materials. Films were the most consistent first choice, but these were closely followed by the games. Findings were similar across all grade, sex and ethnic categories

except for Mexican-American students who rated films substantially higher than the other materials.

Most boring materials. Class discussions and posters were the most frequently listed as the most boring materials. These detailed findings varied somewhat across the different categories, but the overall pattern was consistent across grade, sex, and ethnic categories.

Comparison with other subjects. Students tended to rate the training materials as "more interesting" than other materials used in school. This tended to diminish, however, in comparisons from fifth to ninth grade. Females rated the materials higher than males. Anglo and Mexican-American students rated the materials higher than did Blacks.

Learned the most about. Criminal justice and health care received the highest ratings of careers learned the most about. These results were generally consistent across grades, sexes, and ethnic groups.

Learned the least about. Computer science was the topic most often rated as having learned the "least about." This, also, had consistency across grades, sexes, and ethnic groups.

Some generalizations:

1. Pupils in all grades, of both sexes, and from Black, Anglo, and Mexican-American ethnic groups rated the instructional materials typically in a very favorable manner.

2. Most pupils thought that their teachers had done a good job with the materials.

3. Pupils indicated a favor for using such materials with other subjects.

4. Criminal justice and health care materials as well as instructional results received the highest ratings.

5. Mass communication tended to receive the lowest ratings.

Table 7: Responses to Questionnaire; All Cities

Question	Grade			Sex		Ethnicity		
	5	7	9	M	F	Anglo	Black	Mex-Am.
130. I thought that the materials we used in studying about careers was:								
A. just about right for people my age.	.54	.61	.71	.58	.71	.67	.61	.69
B. really better for people younger than I am.	.15	.12	.12	.17	.09	.11	.17	.07
C. really better for people older than I am.	.31	.27	.17	.26	.20	.22	.23	.24
131. In making the best use of the materials which we used in studying careers, I thought that my teacher:								
A. did an especially good job.	.75	.58	.57	.58	.64	.61	.56	.74
B. did a pretty good job.	.14	.25	.28	.23	.25	.27	.24	.16
C. did a fair job.	.05	.11	.10	.11	.06	.07	.12	.05
D. did not do a very good job.	.02	.04	.03	.02	.03	.02	.04	.03
E. did a poor job.	.04	.03	.03	.05	.01	.03	.04	.03

Table 7, cont.

Question	Grade			Sex		Ethnicity		
	5	7	9	M	F	Anglo	Black	Mex-Am.
132. If we used more study materials such as games, posters, and films, I think that:								
A. I would learn alot more about subjects such as math, English, and social studies.	.56	.48	.53	.51	.55	.49	.56	.62
B. I would learn a little more about subjects such as math, English, and social studies.	.23	.26	.24	.23	.26	.25	.24	.21
C. I would probably not learn any more about subjects such as math, English, and social studies.	.12	.15	.12	.14	.11	.16	.08	.09
D. I would probably not learn as much as I usually do in subjects such as math, English, and social studies.	.09	.11	.11	.13	.09	.10	.12	.09
133. I thought that the best film was the one on:								
A. mass communications.	.16	.13	.14	.12	.17	.14	.14	.20
B. health care.	.36	.30	.34	.26	.41	.35	.33	.25
C. aerospace.	.14	.18	.16	.21	.10	.17	.14	.15
D. criminal justice.	.28	.30	.29	.34	.25	.28	.31	.31
E. computer science.	.07	.09	.07	.07	.08	.06	.09	.10

Table 7, cont.

Question	Grade			Sex		Ethnicity		
	5	7	9	M	F	Anglo	Black	Mex-Am.
134. I thought that the best game was the one on:								
A. computer science.	.04	.06	.08	.06	.07	.06	.08	.06
B. health care.	.14	.08	.07	.10	.08	.07	.13	.09
C. mass communications.	.10	.11	.07	.09	.09	.08	.09	.09
D. criminal justice.	.51	.56	.58	.54	.57	.54	.55	.66
E. aerospace.	.22	.19	.21	.21	.20	.25	.15	.14
135. I thought that the best poster was the one on:								
A. computer science.	.28	.18	.17	.19	.21	.23	.15	.23
B. health care.	.14	.16	.19	.13	.21	.13	.26	.13
C. mass communications.	.18	.25	.23	.21	.23	.23	.19	.24
D. criminal justice.	.29	.26	.23	.29	.22	.24	.28	.24
E. aerospace.	.10	.15	.18	.19	.13	.17	.12	.19

Table 7, cont.

Question	Grade			Sex		Ethnicity		
	5	7	9	M	F	Anglo	Black	Mex-Am.
136. In finding out about new occupations and the opportunities for training in two-year community colleges, I think that I learned the most from:								
A. the films.	.51	.46	.49	.48	.50	.51	.44	.53
B. the games.	.19	.27	.23	.23	.23	.24	.24	.16
C. the posters.	.03	.06	.04	.05	.03	.03	.05	.04
D. the class discussions.	.13	.13	.15	.13	.15	.13	.16	.14
E. what my teacher said.	.15	.09	.08	.11	.09	.08	.11	.14
137. In studying about new occupations and careers, I felt that the most interesting materials were:								
A. the films.	.37	.41	.46	.45	.41	.45	.37	.51
B. the games.	.38	.36	.38	.31	.38	.38	.34	.21
C. the posters.	.10	.07	.05	.09	.05	.04	.09	.11
D. things done in class discussions.	.14	.16	.15	.14	.16	.12	.19	.16

Table 7, cont.

Question	Grade			Sex		Ethnicity		
	5	7	9	M	F	Anglo	Black	Mex-Am.
138. In studying about new occupations and careers, I felt that the most boring materials were:								
A. the films.	.12	.12	.09	.11	.09	.09	.13	.11
B. the games.	.09	.11	.16	.16	.12	.11	.15	.17
C. the posters.	.37	.38	.46	.40	.43	.46	.39	.32
D. things done in class discussions.	.39	.39	.29	.32	.34	.33	.31	.37
139. In comparing how we studied new careers with the way we usually study other subjects such as English, math, or social studies, I thought that the films, games, and posters were:								
A. more boring than most things we use in school.	.04	.07	.06	.07	.05	.05	.08	.03
B. about as interesting as the usual things we use in school.	.16	.15	.13	.18	.11	.12	.18	.12
C. a little more interesting than the usual things we use in school.	.10	.20	.22	.20	.18	.14	.26	.16
D. much more interesting than the materials we usually use in school.	.16	.17	.22	.19	.20	.21	.16	.23
E. very much more interesting than the materials we usually use in school.	.54	.41	.37	.37	.47	.48	.33	.46

Table 7, cont.

Question	Grade			Sex		Ethnicity		
	5	7	9	M	F	Anglo	Black	Mex-Am.
140. I thought that I learned the most about careers in:								
A. health care.	.27	.23	.27	.17	.34	.27	.25	.22
B. criminal justice.	.41	.42	.34	.41	.34	.36	.39	.37
C. computer science.	.07	.10	.12	.11	.09	.09	.13	.09
D. mass communications.	.09	.11	.12	.11	.11	.09	.11	.14
E. aerospace.	.17	.15	.20	.20	.13	.19	.11	.18
141. I thought that I learned the least about careers in:								
A. health care.	.23	.21	.15	.21	.16	.18	.18	.22
B. criminal justice.	.10	.06	.16	.15	.10	.10	.15	.14
C. computer science.	.27	.32	.33	.30	.33	.37	.25	.26
D. mass communications.	.21	.18	.16	.19	.17	.19	.16	.16
E. aerospace.	.19	.23	.20	.16	.25	.16	.27	.22

Effects of Teacher Training: *What are the effects upon occupational knowledge and attitudes, and upon pupils' evaluation of materials, due to having teachers trained in use of the materials?*

Effects upon score gains. Pupils' average score gains in ninth experimental groups having trained teachers were compared with those having untrained teachers on each of the five subtests. Results, as summarized in Table 8, indicated that there were no statistically significant differences between these mean scores. It may be recalled that these comparisons were made in different cities only between the ninth grade classes. In short, teacher training for ninth grades appeared to have no effect upon overall score gains by experimental groups.

Effects upon pupil evaluations. Pupils' responses to questions about the instructional materials were divided between the ninth grade groups who had trained as against untrained teachers. These response comparisons are summarized in Table 9. In general, they show very few differences between responses by pupils having trained as compared with untrained teachers. There was a slight tendency for pupils having trained teachers to rate their teacher as doing a "better job" in making use of the instructional materials, and a stronger tendency for them to rate the criminal justice materials as the ones they "learned the most" from. Again, however, these differences were slight, and probably negligible.

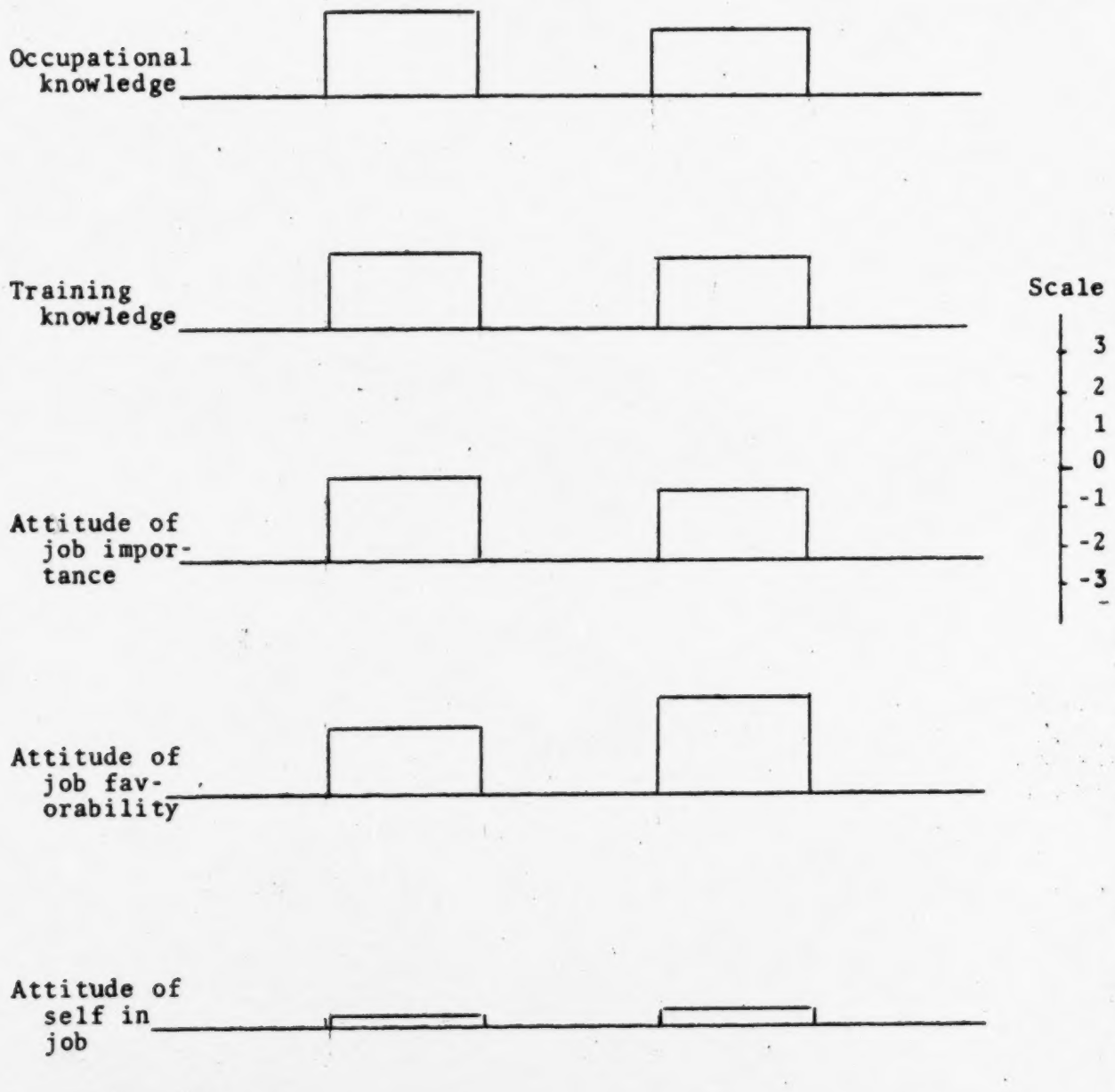
Generalizations:

1. Teacher training had no apparent effect upon score gains in the five main subtests for ninth graders.

2. Only negligible differences were found in pupils' evaluations of materials when compared between ninth grades having trained as against untrained teachers.

Table 8 : Score Gains: Trained as against Untrained Teachers

Score	Trained Teachers	Untrained Teachers
Occupational knowledge		
Training knowledge		
Attitude of job importance		
Attitude of job favorability		
Attitude of self in job		



*Statistically significant ($p<.05$) difference between control and experimental group gains.

Table 9: Pupils' Evaluations, Trained and Untrained Teachers

Questions	Teachers Trained	Teachers Untrained
130. I thought that the materials we used in studying about careers was:		
A. just about right for people of my age.	.63	.70
B. really better for people younger than I am.	.13	.13
C. really better for people older than I am.	.25	.17
131. In making the best use of the materials which we used in studying careers, I thought that my teacher:		
A. did an especially good job.	.65	.49
B. did a pretty good job.	.21	.34
C. did a fair job.	.08	.11
D. did not do a very good job.	.03	.03
E. did a poor job.	.03	.03
132. If we used more study materials such as games, posters, and films, I think that:		
A. I would learn alot more about subjects such as math, English, and social studies.	.55	.47
B. I would learn a little more about subjects such as math, English, and social studies.	.24	.26
C. I would probably not learn any more about subjects such as math, English, and social studies.	.12	.13
D. I would probably not learn as much as I usually do in subjects such as math, English, and social studies.	.09	.14

Questions	Teachers Trained	Teachers Untrained
133. I thought that the best film was the one on:		
A. mass communication.	.15	.12
B. health care.	.32	.39
C. aerospace.	.15	.17
D. criminal justice.	.30	.25
E. computer science.	.08	.07
134. I thought that the best game was the one on:		
A. computer science.	.06	.07
B. health care.	.09	.09
C. mass communications.	.08	.10
D. criminal justice.	.57	.52
E. aerospace.	.20	.22
135. I thought that the best poster was the one on:		
A. computer science.	.20	.18
B. health care.	.17	.17
C. mass communications.	.22	.24
D. criminal justice.	.26	.24
E. aerospace.	.15	.18

Questions	Teachers Trained	Teachers Untrained
136. In finding out about new occupations and the opportunities for training in two-year community colleges, I think that I learned the most from:		
A. the films.	.48	.53
B. the games.	.24	.20
C. the posters.	.03	.06
D. the class discussions.	.15	.13
E. what my teacher said.	.10	.08
137. In studying about new occupations and careers, I felt that the most interesting materials were:		
A. the films.	.41	.48
B. the games.	.36	.31
C. the posters.	.08	.05
D. things done in class discussions.	.15	.16
138. In studying about new occupations and careers, I felt that the most boring materials were:		
A. the fims.	.10	.11
B. the games.	.12	.17
C. the posters.	.42	.43
D. things done in class discussions.	.35	.27

Questions	Teachers Trained	Teachers Untrained
139. In comparing how we studied new careers with the way we usually study other subjects such as English, math, or social studies, I thought that the films, games, and posters were:		
A. more boring than most things we use in school.	.06	.06
B. about as interesting as the usual things we use in school.	.15	.13
C. a little more interesting than the usual things we use in school.	.18	.21
D. much more interesting than the materials we usually use in school.	.18	.23
E. very much more interesting than the materials we usually use in school.	.44	.38
140. I thought that I learned the most about careers in:		
A. health care.	.25	.29
B. criminal justice.	.40	.30
C. computer science.	.09	.14
D. mass communications.	.11	.10
E. aerospace.	.16	.17
141. I thought that I learned the least about careers in:		
A. health care.	.19	.15
B. criminal justice.	.11	.15
C. computer science.	.32	.30
D. mass communications.	.17	.20
E. aerospace.	.20	.21

Teachers' Evaluations: *What were teachers evaluations of the materials and of in-service training?*

Table 10 presents a summary of teacher responses to the 10 questions presented at the conclusion of in-service training. In all, responses were markedly favorable toward the training and the materials, and were also somewhat consistent across the three cities. Generalizations included:

1. Most teacher trainees thought that the career opportunities described in the materials were "important" for their students; responses were less favorable in Houston as compared with Port Arthur and Conroe.

2. Nearly all teachers considered that the training provided by these materials would be "successful."

3. On the average, over two-thirds of the teachers considered their in-service training as "useful."

4. Nearly all teachers considered the films as "effective."

5. Ratings of the posters ranged mainly between being "average" and "very effective."

6. Games were rated as "effective."

7. Over half of the teachers answered a "positive yes" when asked if multi-media materials might be tried in other subject matter areas.

8. Nearly all teachers thought that the training package would "work well" with their students.

9. The "least effective" films were judged as computer science by Houston teachers and mass communications by Port Arthur teachers. (Conroe teachers did not rate the films.)

10. Health care was rated as the "best film" by Houston teachers, with mass communications a close second; aerospace was judged the "best film" by Port Arthur teachers.

Table 10: Teachers' Evaluations

Questions	Responses Houston N=16	Port Arthur N=9	Conroe N=6
1. I think that the career opportunities presented in the multi-meadia materials are:			
A. important for my students.	.38	.78	.83
B. maybe important for my students.	.06	.11	.17
C. maybe important for some of my students, but unimportant to some of them, too.	.50	.11	.00
D. probably unimportant for my students.	.06	.00	.00
E. quite irrelevant to my students.	.00	.00	.00
2. In terms of its stated aims, I think that this training sequence for career opportunities will probably be:			
A. very successful.	.25	.44	.67
B. fairly successful.	.50	.65	.65
C. about average.	.19	.22	.00
D. somewhat unsuccessful.	.06	.00	.00
E. quite unsuccessful.	.00	.00	.00

Table 10, cont.

Questions	Responses Houston N=16	Port Arthur N=9	Conroe N=6
3. I think that the instruction that we have for this career opportunity training package has been:			
A. quite useful.	.69	.78	.83
B. somewhat useful.	.25	.22	.17
C. about average.	.06	.00	.00
D. perhaps not useful.	.00	.00	.00
E. pretty much a waste of time.	.00	.00	.00
4. I would rate the films in this training package as:			
A. very effective.	.63	.78	.33
B. fairly effective.	.31	.22	.50
C. about average.	.06	.00	.00
D. somewhat ineffective.	.00	.00	.00
E. highly ineffective.	.17	.17	.17

Table 10, cont.

Questions	Responses Houston N=16	Port Arthur N=9	Conroe N=6
5. I would rate the posters in this training package as:			
A. highly ineffective.	.00	.00	.17
B. somewhat ineffective.	.06	.22	.00
C. about average.	.25	.44	.17
D. somewhat effective.	.50	.00	.17
E. very effective.	.38	.33	.50
6. I would rate the games in this training package as:			
A. highly ineffective.	.00	.11	.17
B. somewhat ineffective.	.06	.00	.00
C. about average.	.06	.11	.00
D. somewhat effective.	.31	.22	.17
E. very effective.	.56	.56	.66

Table 10, cont.

Questions	Responses Houston N=16	Port Arthur N=9	Conroe N=6
7. Would you like to see multi-media packages developed for other subject areas--for example, for social studies, English, math and the like?			
A. probably not.	.06	.00	.00
B. maybe.	.19	.00	.17
C. probably yes.	.06	.22	.17
D. certainly yes.	.19	.22	.17
E. a most positive yes.	.50	.56	.50
8. I expect that the Project CARE materials will:			
A. work very well with my students.	.31	.33	.50
B. work fairly well with my students.	.50	.56	.34
C. work well with my students, but I am not expecting too much.	.13	.11	.00
D. probably not work very well with my students.	.06	.17	.17
E. not work at all with my students.	.00	.00	.00

Research Methods

Overview

The basic research design can be summarized as follows: Within each school to be sampled comparable pairs of classes were selected from among fifth, seventh, and ninth grades. One class (experimental group) in each pair received Occupational Awareness Training, the second (control group) did not. All groups were pretested with an instrument designed to assess occupational knowledge and attitude variables. After the experimental groups received their specialized training, all groups were post-tested. The experimental group received an additional post-test questionnaire about the instructional materials. In each school several additional experimental classes were included in the study, but in these the teachers did not undergo training in use of the materials.

Results were interpreted in terms of statistical comparisons of pre-to-post-test gains in the knowledge and attitude scores between experimental and control groups, and between groups whose teachers had or had not received training. Such comparisons were made by the use of analysis of variance and appropriate follow-up tests, interpreting statistical significance at the $p<.05$ level. In experimental and control group comparisons, the analyses also included the variable of grade level thus allowing for the testing of interactions between effects of the materials and grade level. Relations of pupil sex, ethnicity, parent educational level, and teacher's attitudes toward the materials with gain scores were assessed by use of special analyses.

Test Materials

Development

Main testing goals. As dictated by the aims of the field evaluation of the Career Awareness materials, the test instrument was designed to obtain primary data on five effects of the instructional package. These corresponded to:

1. knowledge about different careers
2. knowledge of where to get training for these careers
3. favorability of attitude toward the importance of these careers
4. favorability of attitude about the careers themselves
5. favorability of attitude of seeing oneself in one of the careers

Main test items. Test items for the five aspects of assessment were developed from an inventory of careers and attitudes promoted by the materials in the Career Awareness package and from working with small groups of children (fifth through ninth grades) who discussed their interpretations of the materials. Test items were written in a multiple choice format, and all were tried out and sometimes modified, based upon use with small groups of children in developmental activities.

Validity and reliability. Validity of items was interpreted relative to the appearance of relevant information in the instructional package and observation in the developmental phase that children (some, at least) would perceive this information. Reliability was interpreted in terms of children's consistency in answering items which were systematically repeated in develop-

mental activities. Eventually, reliability estimates were based upon correlations between pre- and post-test performances of pupils in the control groups in the overall data. Based upon 729 pairs of scores, the test-retest correlations for the five subtests were:

1. .78: knowledge about different careers
2. .57: knowledge of where to get training for these careers
3. .64: favorability of attitude toward the importance of these careers
4. .69: favorability of attitudes about the careers themselves
5. .64: favorability of attitudes of seeing oneself in one of the careers

Taken together these coefficients were the basis for assuming that the subtest materials were acceptably reliable.

Additional items. In order to assess pupils' subjective reactions to the instructional materials, selected questions were added to the test instrument to elicit attitudes about (1) the overall package, (2) films, games, and posters best liked, (3) the career areas that they felt they learned the most and least about, (4) the instructional job done by their teacher, and (5) whether they thought media materials of the present type would help them in other subjects.

Test Format

Demographic items. Beyond obtaining the pupils' names, age, grade, sex, and classroom designation, four questions elicited information on: (1) father's education, (2) mother's education, (3) ethnic identification, and (4) occupation of the head of the household.

Main test items. Altogether there were 60 questions, 12 for each of the five occupational areas of criminal justice, health care, aerospace, mass communication, and computer science. Again, these were in a multiple choice format. Each of these 12 items represented a particular type of question for which the content was varied for each occupational area. These types were as follows:

A. Occupational knowledge:
   1. definition of the area
   2. definition of a technical occupation in the area
   3. the type of person needed for a particular job
   4. what a person in a particular job does

B. Knowledge of sources of training:
   1. training not in a community college curriculum
   2. a type of training available in a community college
   3. a further type of training available in a community college

C. Attitude about job importance and team importance:
   1. ratings of the importance of a job
   2. ratings of the importance of a job to a team

D. Attitude about job favorability:
   1. rating of the interestingness of a job
   2. rating of the pride that people have in a particular job

E. Attitude of self in job:
   1. ratings of the appeal of a particular job for oneself

Items for rating the materials. Twelve questions asked the pupils to rate various facets of the instructional materials and their reactions to them. These 12 questions are contained in Table 7.

Test booklets. All tests were typewritten and reproduced by photocopy process on both sides of 8½ by 11 inch paper. (Copies of the tests are in the Technical Appendix to this report.) Brief instructions appeared at the top of the first page of each booklet. This was followed in all cases by questions one through four which were demographic items. Beyond this, there were three test booklet forms:

Pretest; all-groups: Questions 5 through 64 constituted the basic 60 items (12 for each occupational area) in a randomized sequence. These booklets were printed on blue stock.

Post-test; control-group: Questions 70 through 129 were the same 60 basic questions as on the pre-test but in a different randomized order. These booklets were printed on light green stock.

Post-test; experimental group: Questions 70 through 129 were the same 60 basic questions as on the pre-test, and items 130 through 141 were for subjective ratings of the materials. These were printed on yellow stock.

Answer sheets. All responses were recorded by students on Optical Scanning Corporation "Standard Answer Sheet-A" (see Technical Appendix).

Teacher Training Evaluations

At the conclusion of teacher training sessions prior to the administration of the Career Awareness materials in the classrooms, teachers completed a ten-item questionnaire asking them to evaluate various aspects of the training as well as the materials. These items were in a multiple choice format, and the individual questions can be seen in Table 10, a summary of teacher evaluations.

Data Gathering

Main Testing

At the time of pretesting, the standard form answer sheets and the pretest booklets (blue) were distributed in classes. Pupils were instructed to fill in their names, grade, sex and a class number designation in labeled locations on the answer sheets. They were further given standard instructions for marking the multiple-choice type form.

Pretesting was then undertaken which involved answering questions 1 through 64. After testing, the booklets and forms were taken up. Teachers stored the answer sheets for subsequent distribution and use in post-testing.

Post-testing involved completion of questions 70 through 129 in the control group booklets (green) or questions 70 through 141 for the experimental groups (yellow) on the same answer sheets as used in pretesting. Sheets and booklets were then taken up and eventually sent for data tabulation.

Testing was undertaken in the cities of Houston (pretest October 22, 1971; post-test November 9), Port Arthur (November 8,

November 23), and Conroe (November 8, November 23), Texas. Schools in these cities included:

Houston: Marshall Jr. High, Sharpstown Jr. High, Lanier Jr. High, Miller Jr. High, Patrick Henry Jr. High, Pugh Elementary, Backshear Elementary, White Elementary, Sutton Elementary, and Scroggins Elementary.

Port Arthur: Washington Elementary, Sims Elementary, Pease Elementary, Lincoln, Edison, and Austin schools.

Conroe: Sam Houston Elementary, Ronyan Elementary, Washington Jr. High, Travis Jr. High, and Conroe High School.

A summary of the numbers of students tested in each city is: Houston, 859; Port Arthur, 501; Conroe 350.

Data Tabulation

Pre-tabulation Activities

Inspection. Prior to tabulation routines, answer sheets were examined for such problems as missing pre- or post-test, improper marking of answers, obviously missing responses, obviously spurious responses (e.g., marking randomly or all one option), and extraneous marks on the sheet. When possible, a sheet was corrected by the research team, as when marking in a missing grade designation, putting in darkened marks, and the like. The greatest problem was missing pre- or post-tests which prevented including a pupil in the study.

Keypunching. All usable answer sheets were subsequently submitted for automatic keypunching by optical scanning process. This was done by the Measurement and Evaluation Center of the University of Texas under a subcontract with Central Texas College. The response data now in keypunch card format were then ready for tabulation.

Tabulation

All tabulation was automatically undertaken by use of special programming prepared for the IBM 360-40 computer system at Central Texas College.* Tabulation involved the following steps:

1. Response items were read from data cards and registered as "1" for correct answers or "0" or incorrect answers on knowledge items, and for a digit directly reflecting attitudinal ratings.

2. Test items were summed for each of the five basic scores for the pretest and for the post-test. Difference scores of post-test minus pre-test were calculated for each of the five variables. These difference scores became a part of each student's output record.

3. Subjective questionnaire ratings were registered as digits and became a part of each student's response record.

4. Demographic data were registered as a part of each student's response record.

5. The class identification code has contained two digits

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*Programming was done by Mr. Bud Goetcher in consultation with Dr. Jack L. Whitehead of Austin, Texas, and under the supervision of the research director (f.w.).

reflecting teachers' evaluations of the training materials; this became a part of each student's record.

Statistical Analyses

Details of the statistical analyses may be found in the Technical Appendix to this report. Interpretations of the analyses were incorporated directly in the reports of the findings. The general strategies for analyses are summarized as follows:

Comparison of Pre-to-Post-test Gains.

The basic analysis model for testing the statistical significance between average score gains of the control and experimental groups was a two-by-three analysis of variance. Such analyses were conducted for each of the five main variables on data from each of the three test cities, and once for all cities combined. The results of these analyses were used in the subsequent comparisons of control as against experimental group mean gain scores for each of the fifth, seventh, and ninth grades within a city. The procedures for this model of analyses of variance may be found in: Donald J. Veldman, Fortran Programming for the Behavioral Sciences (New York, 1967).

The same type analysis of variance, but only involving a direct comparison of experimental groups having trained as against untrained teachers, was used to test score gains relative to teacher training.

Relations of Gains to Other Variables

In order to see the degree to which variables of sex, parent education, occupational status, and teacher attitude were related to pre-to-post-test gains, analyses of variance and various correlational procedures were

calculated for each of the five basic scores on these potentially associated variables. This was done only for the overall data (combining cities). The computational approach described by Veldman (see earlier reference) was used. As noted in the description of results, selected further statistical comparisons were made on an ad hoc basis when gains seemed particularly related to one of the above variables. These analyses are described in such discussions.

Cross-Tabulation of Subjective Data

The results of the questions asking for ratings of the materials were subjected to an overall cross-tabulation analysis on a question by question basis relative to child grade, sex, and ethnicity. A further set of cross-tabulations were made for comparisons between groups having trained or untrained teachers. No statistical inferences were thought necessary in the analyses of these cross-tabulations because patterns of different responses were for the most part directly interpretable. Cross-tabulation procedures developed by Veldman (see earlier reference) were used.